1.6 ACOPOS 1180, 1320

1.6.1 Order Data

Model Number	Short Description	Image
	Servo Drives	
8V1180.00-2	Servo drive 3 x 400-480V 18A 9kW, line filter, braking resistor, DC bus power supply and electronic secure restart inhibit integrated	
8V1320.00-2	Servo drive 3 x 400-480V 32A 16kW, line filter, braking resistor, DC bus power supply and electronic secure restart inhibit integrated	
	Accessories	
8AC110.60-2	ACOPOS plug-in module, CAN interface	
8AC112.60-1	ACOPOS plug-in module, ETHERNET Powerlink interface	
8AC120.60-1	ACOPOS plug-in module, EnDat encoder interface	
8AC122.60-2	ACOPOS plug-in module, resolver interface	
8AC123.60-1	ACOPOS plug-in module, incremental encoder and SSI absolute encoder interface	
8AC130.60-1	ACOPOS plug-in module, 8 digital I/O configurable in pairs as 24V input or as output 400/100mA, 2 digital outputs 2A, Order TB712 terminal block separately	
8AC131.60-1	ACOPOS plug-in module, 2 analog inputs ±10V, 2 digital I/O points which can be configured as a 24V input or 45mA output, Order TB712 terminal block separately	
8AC140.60-1	ACOPOS plug-in module, CPU, x86 100 MHz Intel compatible, 8 MB DRAM, 32 kB SRAM, exchangeable application memory: Compact Flash, 1 CAN interface, 1 Profibus-DP slave interface, 1 RS232 interface, Order program memory separately!	
8AC140.61-2	ACOPOS plug-in module, CPU, ARNC0, x86 100 MHz Intel compatible, 16 MB DRAM, 32 kB SRAM, exchangeable application memory: Compact Flash, 1 CAN interface, 1 Profibus-DP slave interface, 1 RS232 interface, Order application memory separately!	
0PS320.1	24 VDC power supply, 3-phase, 20 A, input 400..500 VAC (3 phases), wide range, DIN rail mounting	

Table 12: Order data for ACOPOS 1180, 1320

Chapter 2
Technical Data

1.6.2 Technical Data

Product ID	8V1180.00-2	8V1320.00-2
General Information		
C-UL-US Listed	Yes	
Power Mains Connection		
Mains Input Voltage	3 x 400 VAC to 480 VAC ±10 % Power filter according to IEC 61800-3-A11 second environment (Limits from CISPR11, Group 2, Class A)	
Frequency	50 / 60 Hz ± 4%	
Installed Load	Max. 17 kVA	Max. 30 kVA
Starting Current at 400 VAC	13 A	
Switch-on Interval	> 10 s	
Power Loss at Max. Device Power without Braking Resistor	Approx. 500 W	Approx. 800 W
24 VDC Supply		
Input Voltage	24 VDC ± 25 % / -20 %	
Input Capacitance	40000 μF	

Current Requirements at 24 VDC [1]
    Mains Input Voltage Applied
    Mains Input Voltage not Applied
	--- [2]
	Max. 2.8 A + current for the motor holding brake + current on the 24 VDC output	

DC Bus Power Supply Switch-on Voltage	400 VDC	
DC Bus		
DC Bus Capacitance	940 μF	1645 μF
Motor Connector		
Continuous Current [3]	19 A_{eff}	34 A_{eff}

Reduction of Continuous Current Depending on Environmental Temperature [4]
    Mains Input Voltage: 400 VAC
        Switching Frequency 20 kHz
        Switching Frequency 10 kHz
        Switching Frequency 5 kHz
    Mains Input Voltage: 480 VAC
        Switching Frequency 20 kHz
        Switching Frequency 10 kHz
        Switching Frequency 5 kHz
	
	No reduction
	No reduction
	No reduction
	
	No reduction
	No reduction
	No reduction
		
		0.61 A_{eff} per °C (≥ 40 °C)
		No reduction
		No reduction
		
		0.61 A_{eff} per °C (≥ 25 °C)
		No reduction
		No reduction

Reduction of Continuous Current Depending on Altitude Starting at 500 m Above Sea Level	1.9 A_{eff} per 1000 m	3.4 A_{eff} per 1000 m
Peak Current	50 A_{eff}	80 A_{eff}
Nominal Switching Frequency	10 kHz	
Maximum Motor Line Length	25 m	
Protective Measures	Short circuit and ground fault protection	

Table 13: Technical data for ACOPOS 1180, 1320

Product ID	8V1180.00-2	8V1320.00-2
Motor Holding Brake Connection		
Maximum Output Current	1.5 A	
Protective Measures	Short circuit and ground fault protection	
Braking Resistor		
Peak Power Int. / Ext.	14 / 40 kW	
Continuous Power Int. / Ext.	0.4 / 8 kW	
Minimum Braking Resistance (ext.)	15 Ω	
Rated Current of the Built-in Fuse	10 A (fast-acting)	
Trigger Inputs		
Number of Inputs	2	
Wiring	Sink	

Electrical Isolation
    Input - ACOPOS
    Input - Input
	Yes
	No	

Input Voltage
    Nominal
    Maximum
	24 VDC
	30 VDC	

Switching Threshold
    LOW
    HIGH
	< 5 V
	>15 V	

Input Current at Nominal Voltage	Approx. 10 mA	
Switching Delay	Max. 55 µs (digitally filtered)	
Modulation Compared to Ground Potential	Max. ±38 V	
Limit Switch and Reference Inputs		
Number of Inputs	3	
Wiring	Sink	

Electrical Isolation
    Input - ACOPOS
    Input - Input
	Yes
	No	

Input Voltage
    Nominal
    Maximum
	24 VDC
	30 VDC	

Switching Threshold
    LOW
    HIGH
	< 5 V
	>15 V	

Input Current at Nominal Voltage	Approx. 4 mA	
Switching Delay	Max. 2.0 ms	
Modulation Compared to Ground Potential	Max. ±38 V	
Enable Input		
Number of Inputs	1	
Wiring	Sink	
Electrical Isolation Input - ACOPOS	Yes	

Table 13: Technical data for ACOPOS 1180, 1320 (Forts.)

Chapter 2
Technical Data

Product ID	8V1180.00-2	8V1320.00-2

Input Voltage
    Nominal
    Maximum
	24 VDC
	30 VDC	

Switching Threshold
    LOW
    HIGH
	< 5 V
	>15 V	

Input Current at Nominal Voltage	Approx. 30 mA	

Switching Delay
    Enable 1 -> 0, PWM Off
    Enable 0 -> 1, Ready for PWM
	Max. 2.0 ms
	Max. 100 µs	

Modulation Compared to Ground Potential	Max. ±38 V	
Operational Conditions		
Environmental Temperature During Operation Max. Environmental Temperature [5)]	0 to 50° C +55 °C	
Relative Humidity During Operation	5 to 95%, non-condensing	
Installation at Altitudes Above Sea Level Maximum Installation Altitude [6)]	0 to 500 m 2000 m	
Degree of Pollution According to IEC 60664-1	2 (non-conductive material)	
Over-voltage Category According to IEC 60364-4-443:1999	II	
Protection According to IEC 60529	IP20	
Storage and Transport Conditions		
Storage Temperature	-25 to +55 °C	
Relative Humidity During Storage	5 to 95%, non-condensing	
Transport Temperature	-25 to +70° C	
Relative Humidity During Transport	95 % at +40 °C	
Mechanical Characteristics		

Dimensions
    Width
    Height
    Depth
	200 mm
	375 mm
	234 mm	

Weight	10.1 kg	10.6 kg

Table 13: Technical data for ACOPOS 1180, 1320 (Forts.)

1) The current requirements depend on the configuration of the ACOPOS servo drive.

2) The 24 VDC supply voltage for the ACOPOS servo drive is created by the integrated DC bus power supply, which reduces the 24 VDC current requirements (I_{24VDC}) to 0. Mains Input Voltage: 3 x 400 VAC to 480 VAC ± 10 %.

3) Valid in the following conditions: Mains input voltage 400 VAC, nominal switching frequency, 40 °C environmental temperature, installation altitudes < 500 m above sea level.

4) The nominal switching frequency values for the respective ACOPOS servo drive are marked in bold.

5) Continuous operation of ACOPOS servo drives at environmental temperatures ranging from 40 °C to max. 55 °C is possible (taking the continuous current reductions listed into consideration), but results in a shorter lifespan.

6) Continuous operation of ACOPOS servo drives at altitudes ranging from 500 m to 2000 m above sea level is possible (taking the continuous current reductions listed into consideration). Additional requirements are to be arranged with B&R.
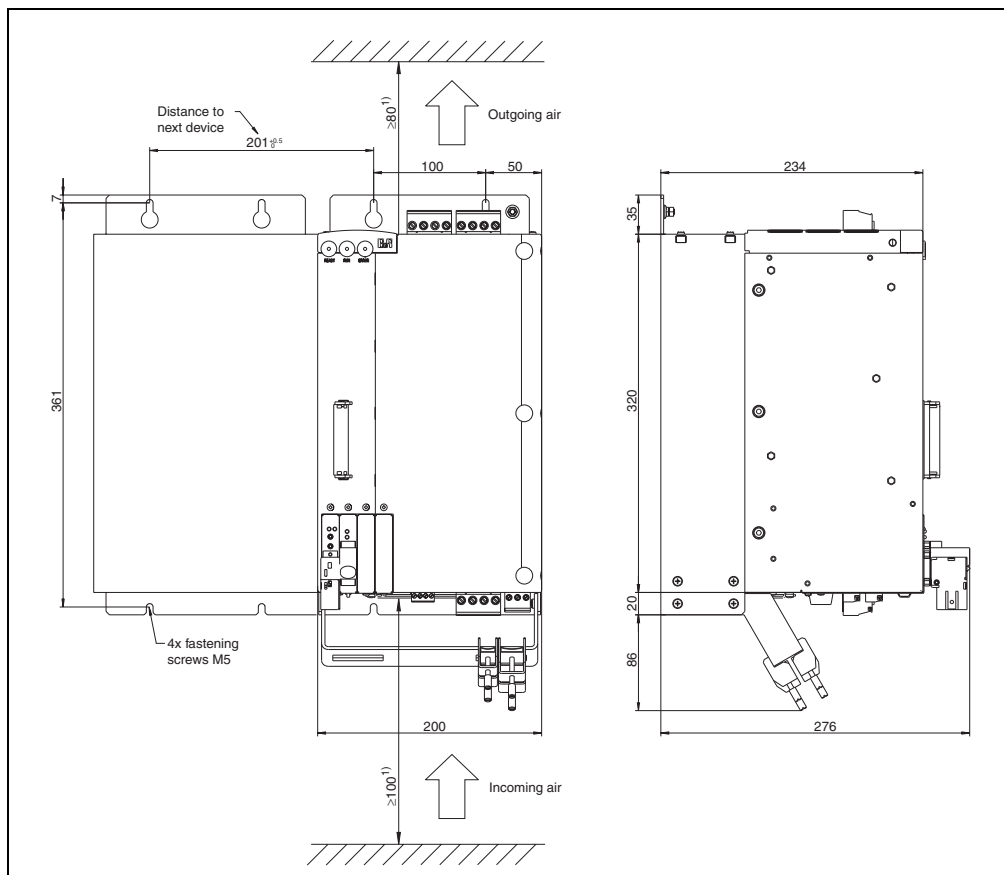
2.3 ACOPOS 1180, 1320

Figure 17: Dimensional diagram and installation dimensions for ACOPOS 1180, 1320

1) For proper air circulation, at least 80 mm has to be left free above and below the ACOPOS servo drive. Approximately 100 mm free space is required under the ACOPOS servo drive to prevent cabling problems.

Chapter 5 • Wiring

1. General Information

1.1 Electromagnetic Compatibility of the Installation

1.1.1 General Information

If the guidelines for elecromagnetic compatibility of the installation are followed, ACOPOS servo drives meet EMC guidelines 89/336/EWG and low-voltage guidelines 73/23/EWG. They meet the requirements for harmonized EMC product standard IEC 61800-3:1996 + A11:2000 for industry (second environment).

Additional EMC measures must be implemented by the manufacturer of machines or systems if the product standards for the machine has lower limits or if the machine should conform to generic standard IEC 61000-6-4. Additional EMC measures may also be needed for machines with a large number of ACOPOS servo drives. The installation of a central line filter is mostly sufficient in such cases. Proof of conformity to the necessary limits must be provided according to the documentation for use of the EMC guidelines from the manufacturer or distributor of the machine or system.

Additional EMC measures are needed when operating ACOPOS servo drives in living area or when connecting ACOPOS servo drives to a low voltage system which supplies buildings in living areas without an intermediate transformer (first environment).

Chapter 5
Wiring

1.1.2 Installation Notes

1) The switching cabinet or the system must be constructed appropriately.

2) To prevent the effects of disturbances, the following lines must be properly shielded:

    • motor lines

    • encoder cables

    • control lines

    • data cables

3) Inductive switching elements such as contactors or relays are to be equipped with corresponding suppressor elements such as varistors, RC elements or damping diodes.

4) All electrical connections are to be kept as short as possible.

5) Cable shields are to be attached to the designated shield terminals and the plug housing.

6) Shielded cables with copper mesh or tinned copper mesh are to be used. Twisting or extending the protective mesh using single conductors is not allowed.

7) Unused cable conductors are to be grounded on both sides if possible.

The ground connections and shield connections have to be made as illustrated in the following diagram.
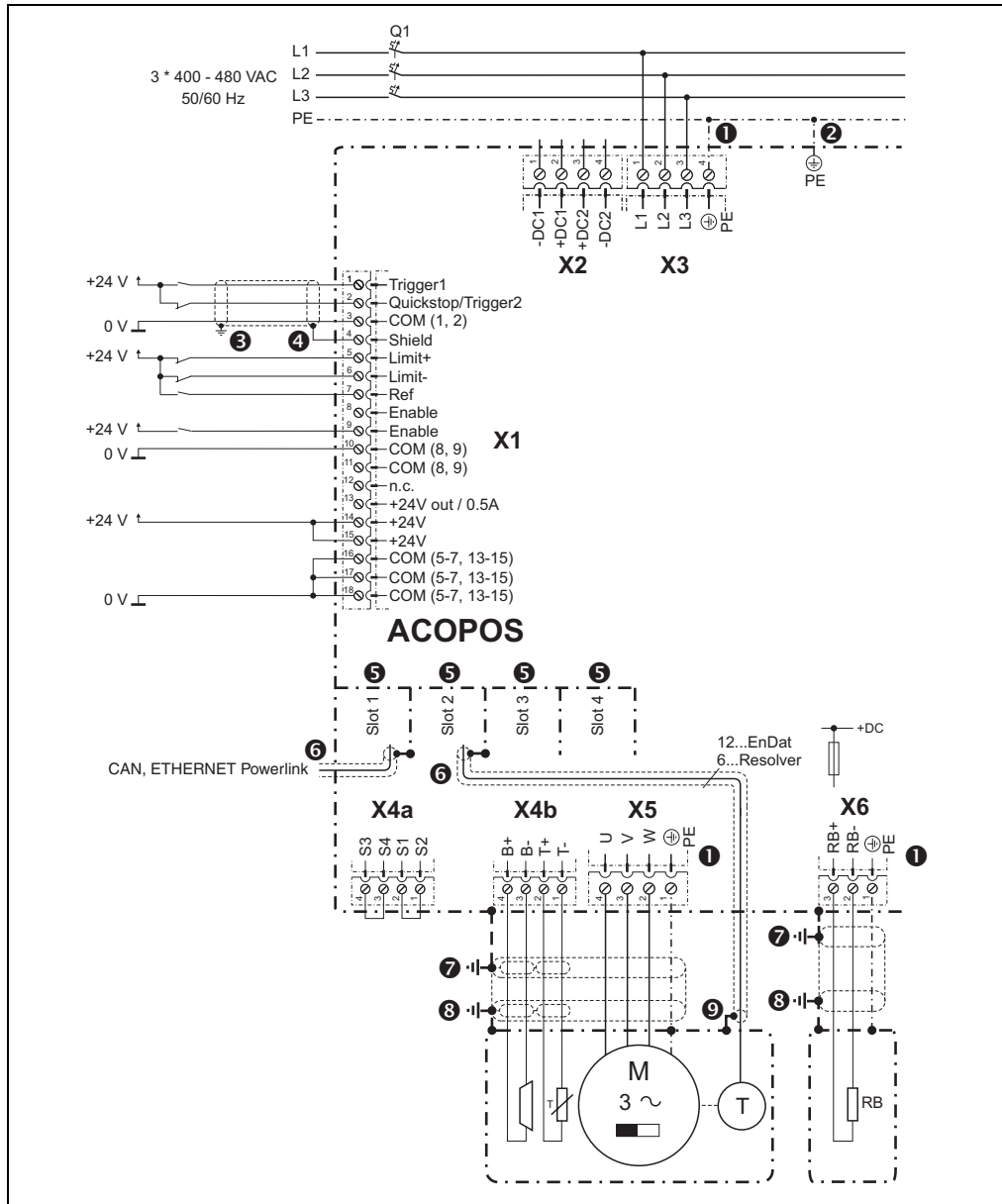
Figure 32: Connection diagram for ground and shield connections

❶ The protective ground conductors (PE) for the power mains, the motor lines and external braking resistor connection are internally connected with the housing of the ACOPOS servo drive.

❷ The second protective ground conductor connection is required because of the increased discharge current (> 3.5 mA) on ACOPOS servo drives 1022, 1045, 1090, 1180 and 1320. The same cross section as the power mains protective ground conductor must be used.

❸ Both trigger inputs are only filtered internally with approx. 50 μs. Make sure the cable shield is grounded properly.

❹ The cable shield must be attached to the shield connector.

❺ On all plug-in modules, the two screws used to fasten the module must be tightened so that the mounting bracket is connected to ground.

❻ Cable connection via DSUB plug:
The cable shield must be connected using the designated clamp in the metallic or metal plated plug housing. The fastening screws must be tightened.

Cable connection via terminals:
The cable shield must be attached to the shield connection terminal.

Cable connection via RJ45 plug:
Also grounding the cable shield provides an improvement in EMC properties. Grounding should take place on both sides, extensively and near to the connector.
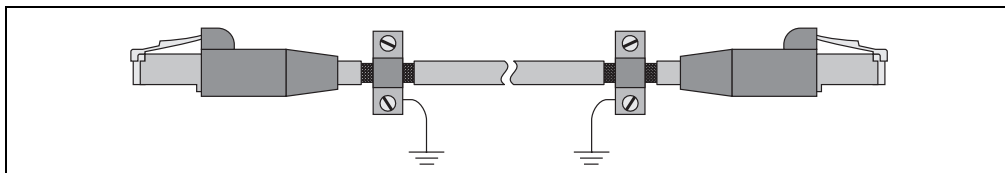

Figure 33: Cable shield grounding for the ETHERNET Powerlink cable

❼ The cable shield for the motor line or the connection cable for the external braking resistor is connected with the housing of the ACOPOS servo drive via the grounding plate using the grounding clamp provided:
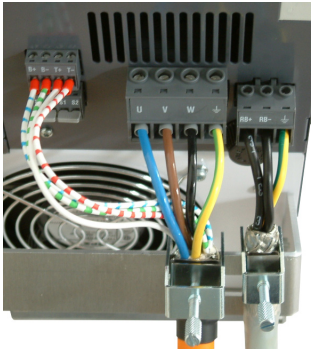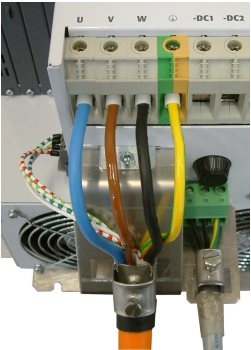
Shield connection for the motor cable using grounding clamps	
ACOPOS 1010, 1016	**ACOPOS 1022, 1045, 1090**
ACOPOS 1180, 1320	**ACOPOS 1640, 128M**

Table 73: Grounding of the motor cable on the ACOPOS servo drive

❽ On the motor side, the cable shield for the motor line is connected to the motor housing using the motor plug and connected to ground via the machine.
The cable shield on the connection cable for the external braking resistor must be connected with the housing of the braking resistor.

❾ On the motor side, the encoder cable shield is connected to the motor housing using the encoder plug and connected to ground via the machine.

Chapter 5
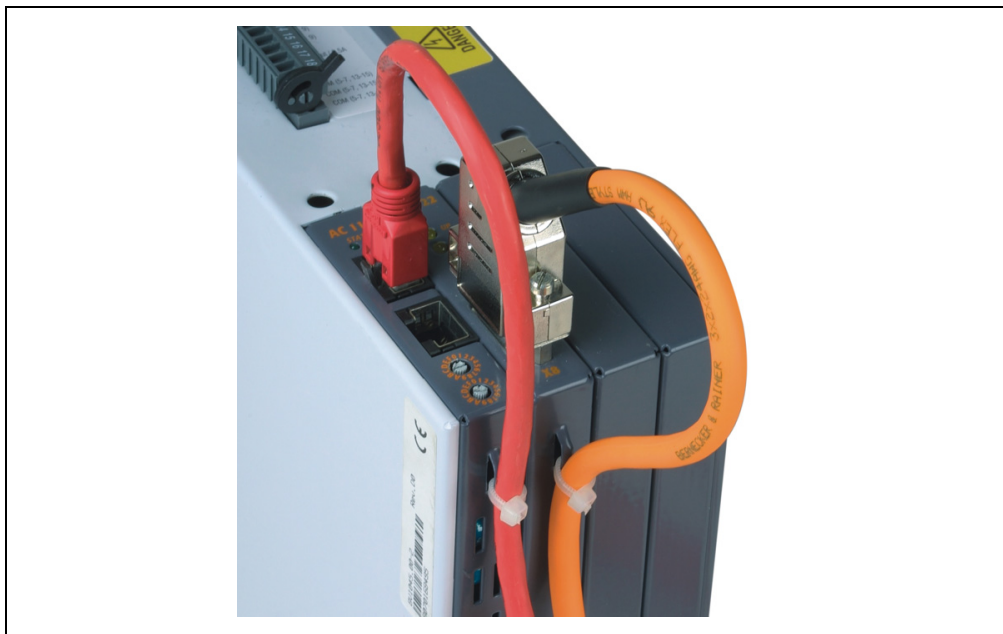Wiring

1.2 Connecting Cables to Plug-in Modules

Figure 34: Connecting Cables to Plug-in Modules

Stress relief for the cable is implemented using a cable tie. The cable tie is to be run through the eye on the bottom of the plug-in module.

Make sure that the ventilation slots on the bottom of the ACOPOS drive are not blocked.

1.4 Overview of the Terminal Cross Sections [1)]

Connector	Wire Types Approbation Data	8V1010.00-2 8V1010.50-2 8V1016.00-2 8V1016.50-2 [mm²]	[AWG]	8V1022.00-2 8V1045.00-2 8V1090.00-2 [mm²]	[AWG]	8V1180.00-2 8V1320.00-2 [mm²]	[AWG]	8V1640.00-2 [mm²]	[AWG]	8V128M.00-2 [mm²]	[AWG]
X1	Solid core / multiple conductor lines	0.5 - 1.5	20 - 14	0.5 - 1.5	20 - 14	0.5 - 1.5	20 - 14	0.5 - 1.5	20 - 14	0.5 - 1.5	20 - 14
	Flexible and fine wire lines without Wire Tip Sleeves with Wire Tip Sleeves	0.5 - 1.5 0.5 - 1.5	20 - 14 20 - 14	0.5 - 1.5 0.5 - 1.5	20 - 14 20 - 14	0.5 - 1.5 0.5 - 1.5	20 - 14 20 - 14	0.5 - 1.5 0.5 - 1.5	20 - 14 20 - 14	0.5 - 1.5 0.5 - 1.5	20 - 14 20 - 14
	Approbation Data UL/C-UL-US CSA	--- ---	26 - 14 26 - 14	--- ---	26 - 14 26 - 14	--- ---	26 - 14 26 - 14	--- ---	26 - 14 26 - 14	--- ---	26 - 14 26 - 14
Holding Torque for the Terminal Screws [Nm]		0.2 ... 0.25		0.2 ... 0.25		0.2 ... 0.25		0.2 ... 0.25		0.2 ... 0.25	
X2 **DC Bus**	Solid core / multiple conductor lines	0.2 - 4	24 - 10	0.2 - 4	24 - 10	0.5 - 10	20 - 7	10 - 50	7 - 0	16 - 95	6 - 3/0
	Flexible and fine wire lines without Wire Tip Sleeves with Wire Tip Sleeves	0.2 - 4 0.25 - 4	24 - 10 23 - 10	0.2 - 4 0.25 - 4	24 - 10 23 - 10	0.5 - 6 0.5 - 6	20 - 9 20 - 9	10 - 35 10 - 35	7 - 2 7 - 2	10 - 70 10 - 70	7 - 2/0 7 - 2/0
	Approbation Data UL/C-UL-US CSA	--- ---	30 - 10 28 - 10	--- ---	30 - 10 28 - 10	--- ---	20 - 8 20 - 8	--- ---	10 - 2 12 - 2	--- ---	6 - 2/0 6 - 2/0
Holding Torque for the Terminal Screws [Nm]		0.5 ... 0.6		0.5 ... 0.6		1.2 ... 1.5		3 ... 4		6 ... 10	
X3 **Power mains**	Solid core / multiple conductor lines	0.2 - 4	24 - 10	0.2 - 4	24 - 10	0.5 - 10	20 - 7	10 - 50	7 - 0	16 - 95	6 - 3/0
	Flexible and fine wire lines without Wire Tip Sleeves with Wire Tip Sleeves	0.2 - 4 0.25 - 4	24 - 10 23 - 10	0.2 - 4 0.25 - 4	24 - 10 23 - 10	0.5 - 6 0.5 - 6	20 - 9 20 - 9	10 - 35 10 - 35	7 - 2 7 - 2	10 - 70 10 - 70	7 - 2/0 7 - 2/0
	Approbation Data UL/C-UL-US CSA	--- ---	30 - 10 28 - 10	--- ---	30 - 10 28 - 10	--- ---	20 - 8 20 - 8	--- ---	10 - 2 12 - 2	--- ---	6 - 2/0 6 - 2/0
Holding Torque for the Terminal Screws [Nm]		0.5 ... 0.6		0.5 ... 0.6		1.2 ... 1.5		3 ... 4		6 ... 10	
X4a, X4b **Motor (holding brake, temperature sensor)**	Solid core / multiple conductor lines	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12	0.2 - 2.5	24 - 12
	Flexible and fine wire lines without Wire Tip Sleeves with Wire Tip Sleeves	0.2 - 2.5 0.25 - 2.5	24 - 12 23 - 12	0.2 - 2.5 0.25 - 2.5	24 - 12 23 - 12	0.2 - 2.5 0.25 - 2.5	24 - 12 23 - 12	0.2 - 2.5 0.25 - 2.5	24 - 12 23 - 12	0.2 - 2.5 0.25 - 2.5	24 - 12 23 - 12
	Approbation Data UL/C-UL-US CSA	--- ---	30 - 12 28 - 12	--- ---	30 - 12 28 - 12	--- ---	30 - 12 28 - 12	--- ---	30 - 12 28 - 12	--- ---	30 - 12 28 - 12
Holding Torque for the Terminal Screws [Nm]		0.5 ... 0.6		0.5 ... 0.6		0.5 ... 0.6		0.5 ... 0.6		0.5 ... 0.6	
X5 **Motor (power)**	Solid core / multiple conductor lines	0.2 - 4	24 - 10	0.2 - 4	24 - 10	0.5 - 10	20 - 7	10 - 50	7 - 0	16 - 95	6 - 3/0
	Flexible and fine wire lines without Wire Tip Sleeves with Wire Tip Sleeves	0.2 - 4 0.25 - 4	24 - 10 23 - 10	0.2 - 4 0.25 - 4	24 - 10 23 - 10	0.5 - 6 0.5 - 6	20 - 9 20 - 9	10 - 35 10 - 35	7 - 2 7 - 2	10 - 70 10 - 70	7 - 2/0 7 - 2/0
	Approbation Data UL/C-UL-US CSA	--- ---	30 - 10 28 - 10	--- ---	30 - 10 28 - 10	--- ---	20 - 8 20 - 8	--- ---	10 - 2 12 - 2	--- ---	6 - 2/0 6 - 2/0
Holding Torque for the Terminal Screws [Nm]		0.5 ... 0.6		0.5 ... 0.6		1.2 ... 1.5		3 ... 4		6 ... 10	
X6 **External braking resistor**	Solid core / multiple conductor lines	---	---	---	---	0.2 - 4	24 - 10	0.5 - 10	20 - 7	0.5 - 10	20 - 7
	Flexible and fine wire lines without Wire Tip Sleeves with Wire Tip Sleeves	--- ---	--- ---	--- ---	--- ---	0.2 - 4 0.25 - 4	24 - 10 23 - 10	0.5 - 6 0.5 - 6	20 - 9 20 - 9	0.5 - 6 0.5 - 6	20 - 9 20 - 9
	Approbation Data UL/C-UL-US CSA	--- ---	--- ---	--- ---	--- ---	--- ---	30 - 10 28 - 10	--- ---	20 - 8 20 - 8	--- ---	20 - 8 20 - 8
Holding Torque for the Terminal Screws [Nm]		---		---		0.5 ... 0.6		1.2 ... 1.5		1.2 ... 1.5	

Table 74: Terminal cross sections for ACOPOS servo drives

1) ACOPOS 1022/1045/1090 revision I0 and up; ACOPOS 1180/1320 revision F0 and up; ACOPOS 1640 revision K0 and up; ACOPOS 128M revision C0 and up.
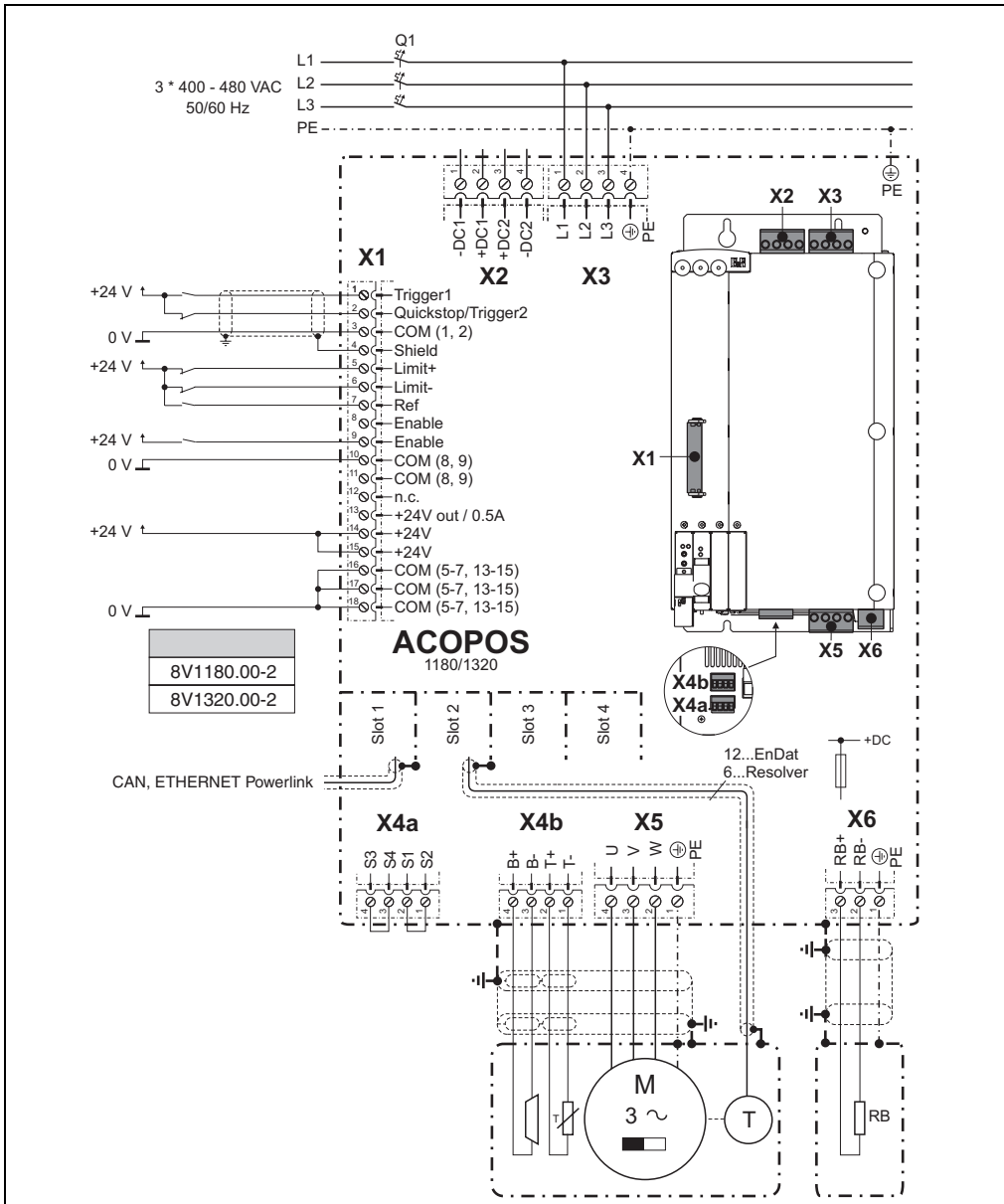
Chapter 5 Wiring

4. Pin Assignments ACOPOS 1180, 1320 [1)]

Figure 44: Pin assignment overview ACOPOS 1180, 1320

1) Starting with revision F0.

Chapter 5
Wiring

4.1 Pin Assignments for Plug X1

X1	Pin	Description	Function
	1	Trigger1	Trigger 1
	2	Quickstop/Trigger2	Quickstop/Trigger 2
	3	COM (1, 2)	Trigger 1, Quickstop/Trigger 2 - 0 V
	4	Shield	Shielding
	5	Limit+	Positive HW limit
	6	Limit-	Negative HW limit
	7	Ref	Reference switch
	8	Enable	Enable
	9	Enable	Enable
	10	COM (8, 9)	Enable 0 V
	11	COM (8, 9)	Enable 0 V
	12	---	---
	13	+24V out / 0.5A	+24 V output / 0.5 A
	14	+24V	Supply +24 V
	15	+24V	Supply +24 V
	16	COM (5-7, 13-15)	Supply 0 V
	17	COM (5-7, 13-15)	Supply 0 V
	18	COM (5-7, 13-15)	Supply 0 V
	The following connections are linked with each other internally in the device:		

The following connections are linked with each other internally in the device:

- Pin 8 --> Pin 9 (Enable)
- Pin 10 --> Pin 11 (Enable 0 V)
- Pin 14 --> Pin 15 (Supply +24 V)
- Pin 16 --> Pin 17 --> Pin 18 (Supply 0 V)

Terminal Cross Sections see table 74 "Terminal cross sections for ACOPOS servo drives" on page 165.

Table 93: Pin assignments for plug X1 ACOPOS 1180, 1320
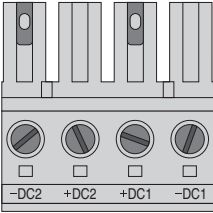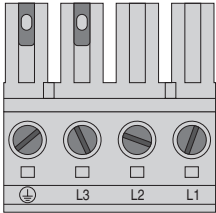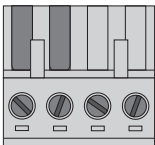
4.2 Pin Assignments for Plug X2

X2	Pin	Description	Function
	1	-DC1	U DC bus -
	2	+DC1	U DC bus +
	3	+DC2	U DC bus +
	4	-DC2	U DC bus -
		Terminal Cross Sections see table 74 "Terminal cross sections for ACOPOS servo drives" on page 165.	

Table 94: Pin assignments for plug X2 ACOPOS 1180, 1320

4.3 Pin Assignments for Plug X3

X3	Pin	Description	Function
	1	L1	Power mains connection L1
	2	L2	Power mains connection L2
	3	L3	Power mains connection L3
	4	PE	Protective ground conductor
		Terminal Cross Sections see table 74 "Terminal cross sections for ACOPOS servo drives" on page 165.	

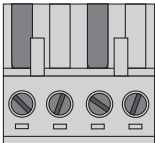Table 95: Pin assignments for plug X3 ACOPOS 1180, 1320

4.4 Pin Assignments for Plugs X4a, X4b

X4a	Pin	Description	Function
	1	S2	Activation, supply for the external holding brake (+)
	2	S1	Activation for the external holding brake (+)
	3	S4	Activation, supply for the external holding brake (-)
	4	S3	Activation for the external holding brake (-)
		Terminal Cross Sections see table 74 "Terminal cross sections for ACOPOS servo drives" on page 165.	

Table 96: Pin assignments for plug X4a ACOPOS 1180, 1320

X4b	Pin	Description	Function
	1	T-	Temperature Sensor -
	2	T+	Temperature Sensor +
	3	B-	Brake -
	4	B+	Brake +
		Terminal Cross Sections see table 74 "Terminal cross sections for ACOPOS servo drives" on page 165.	

Table 97: Pin assignments for plug X4b ACOPOS 1180, 1320

4.4.1 Wiring the output for the motor holding brake

The supply, activation and monitoring of the output for the motor holding brake can take place via the the X4a connector in three different ways:
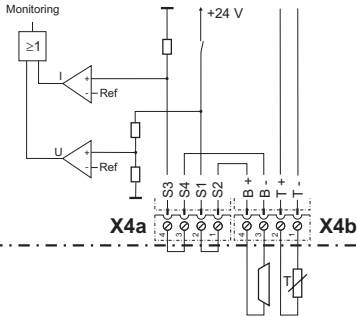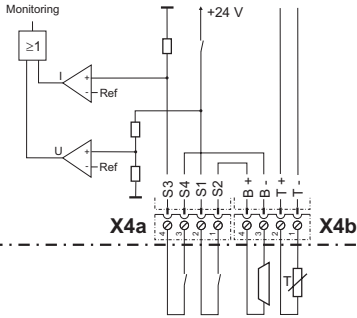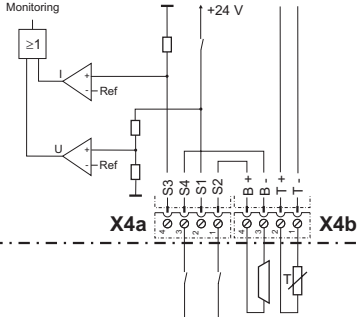
	Image	Description
1	Monitoring ≥1 I Ref U Ref S3 S4 S1 S2 B+ B- T+ T- **X4a** +24 V **X4b**	• **Supply:** Internally by the ACOPOS servo drive • **Activation:** Internally by the ACOPOS servo drive • **Monitoring:** Internally by the ACOPOS servo drive A jumper must be placed between S1 and S2 as well as S3 and S4 on the X4a connector. [1]
2	Monitoring ≥1 I Ref U Ref S3 S4 S1 S2 B+ B- T+ T- **X4a** +24 V **X4b**	• **Supply:** Internally by the ACOPOS servo drive • **Activation:** Internally by the ACOPOS servo drive and also possible externally using potential free contacts [2] • **Monitoring:** Internally by the ACOPOS servo drive **Information:** **The parameters for ACOPOS internal monitoring must be set according to the requirements of the application. [3]**
3	Monitoring ≥1 I Ref U Ref S3 S4 S1 S2 B+ B- T+ T- **X4a** +24 V **X4b** 0 V +24 V	• **Supply:** External • **Activation:** External • **Monitoring:** External **Information:** **ACOPOS internal monitoring cannot be used here; therefore it must be deactivated using software. [4]**

Table 98: Activation for the external holding brake

1) Both jumpers are already on the X4a connector delivered with the ACOPOS servo drives.

2) External potential free contacts can be connected between S1 and S2 as well as between S3 and S4. This makes it possible to activate the holding brake using an external safety circuit independent of the control integrated in the ACOPOS servo drive.

3) The parameters are set using ParID 90 (1 ... internal monitoring active; 5 ... internal monitoring not active).

4) Deactivation takes place using ParID 90 (5 ... internal monitoring not active).
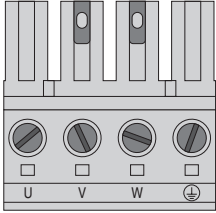
4.5 Pin Assignments for Plug X5

X5	Pin	Description	Function
	1	PE	Protective ground conductor
	2	W	Motor connection W
	3	V	Motor connection V
	4	U	Motor connection U
	Terminal Cross Sections see table 74 "Terminal cross sections for ACOPOS servo drives" on page 165.		

Table 99: Pin assignments for plug X5 ACOPOS 1180, 1320
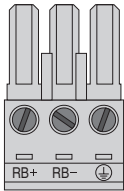
4.6 Pin Assignments for Plug X6

X6	Pin	Description	Function
	1	PE	Protective ground conductor
	2	RB-	Brake Resistance -
	3	RB+	Brake Resistance +
	Terminal Cross Sections see table 74 "Terminal cross sections for ACOPOS servo drives" on page 165.		

Table 100: Pin assignments for plug X6 ACOPOS 1180, 1320

Chapter 5
Wiring

4.7 Protective Ground Connection (PE)

The protective ground conductor is connected to the threaded bolt M5 provided using a cable lug. For information concerning dimensioning see section 1.1.3 "Protective Ground Connection (PE)" on page 122.

Image	Pin	Description	Function
	---	PE	Protective ground conductor

Terminal Cross Sections	[mm²]	AWG
Cable lug for threaded bolt M5	0.25 - 16	23 - 5

Table 101: Protective ground conductor (PE) ACOPOS 1180, 1320

Danger!

Before turning on the servo drive, make sure that the housing is properly connected to ground (PE rail). The ground connection must be made, even when testing the servo drive or when operating it for a short time!

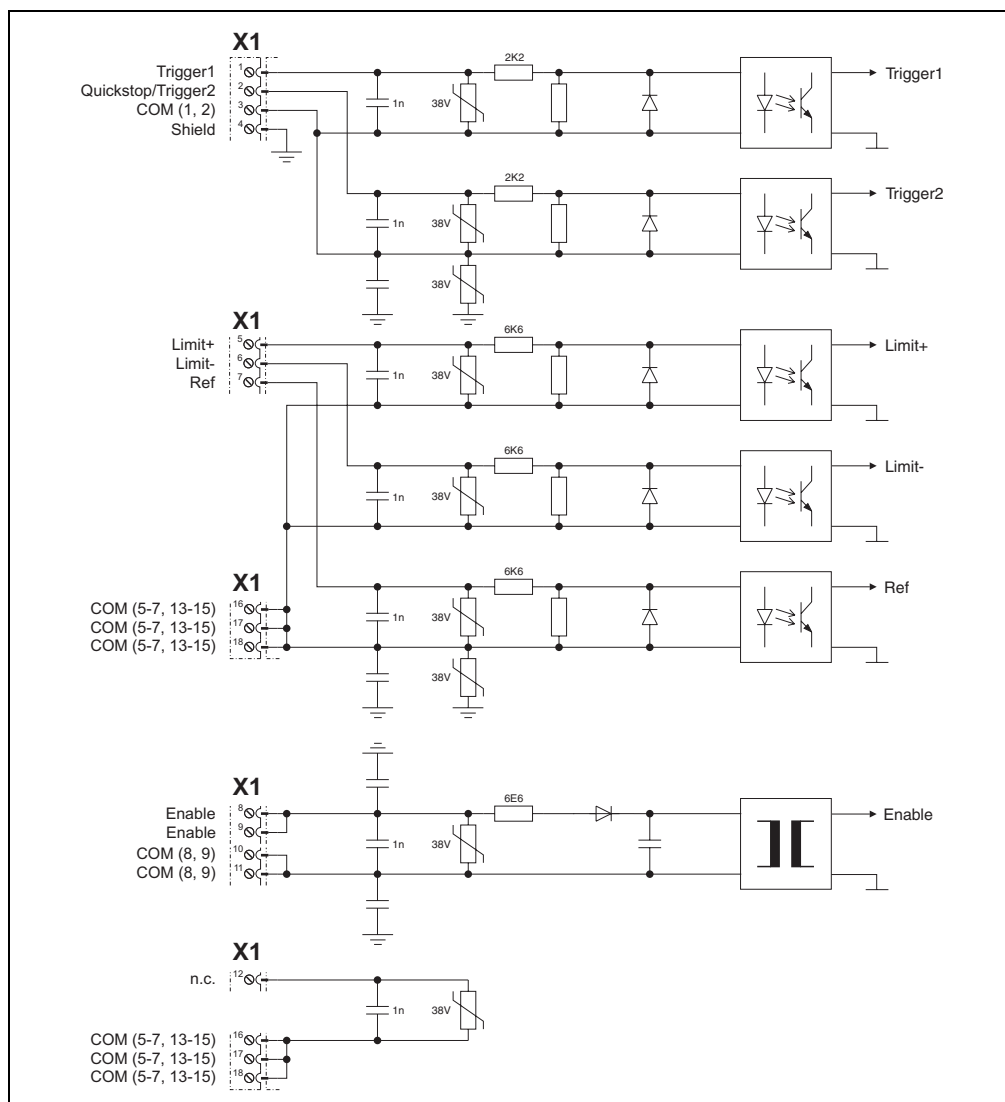## 4.8 Input/Output Circuit Diagram
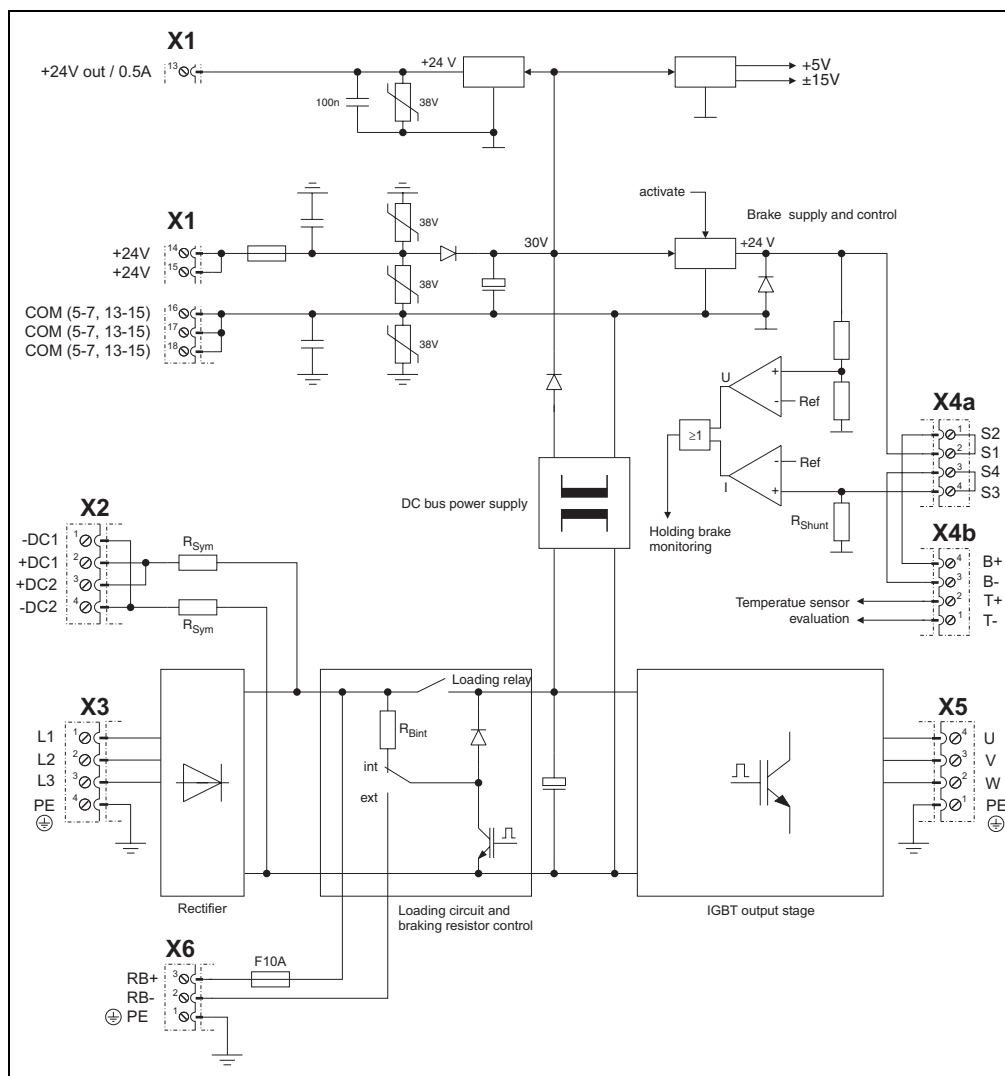

Figure 45: Input/Output Circuit Diagram ACOPOS 1180, 1320

Figure 45: Input/Output Circuit Diagram ACOPOS 1180, 1320 (Forts.)